

What is claimed is:

1. A cutting insert for metalworking operations comprised of an insert body having:
  - a) a top surface and a bottom surface;
  - b) sides between the top surface and the bottom surface, wherein the sides
    - 5 are comprised of core sides and tip sides;
    - c) top edges at the intersection of the top surface with the sides;
    - d) bottom edges at the intersection of the bottom surface with the sides;
    - e) a core defined by two pairs of core sides, wherein each pair has a first core side and a second core side and wherein the top edges of each pair of core sides
      - 10 form a core angle with one another;
        - 1) wherein, in a plan view, the top edge of the first core side of one pair is parallel to the top edge of the first core side of the other pair;
        - 2) wherein, in a plan view, the top edge of the second core side of one pair is parallel to the top edge of the second core side of the other pair;
    - f) a first cutting portion and a second cutting portion, each extending
      - 15 from the core, wherein each cutting portion is comprised of:
        - 1) a pair of tip sides having top edges converging at a tip angle to form a cutting tip; and
        - 2) a bisector line bisecting the tip angle;
    - g) wherein, in a plan view, the bisector line of the first cutting portion is
      - 20 offset from and parallel to the bisector line of the second cutting portion, and
      - h) wherein the tip angle is less than the core angle.
2. The cutting insert according to claim 1, wherein one tip side of each cutting tip is common with the second core side of each pair of core sides.
3. The cutting insert according to claim 1, wherein the tip angle is between 15° and 85°.
4. The cutting insert according to claim 3, wherein each tip angle is 35°.

5. The cutting insert according to claim 4, wherein each tip angle is 55°.
6. The cutting insert according to claim 1, wherein the first tip angle is equal to the second tip angle.
7. The cutting insert according to claim 1, wherein the first tip angle is not equal to the second tip angle.
8. The cutting insert according to claim 1, wherein each cutting portion intersects with the core at a point recessed from a point defined by the intersection of an extension of the core side each with the cutting portion.
9. The cutting insert according to claim 1, wherein the insert is indexable.
10. The cutting insert according to claim 1, further including a bore extending between the top surface and the bottom surface to accept a retention pin for retaining the insert within a pocket of a toolholder.
11. The cutting insert according to claim 1, wherein the top and bottom surfaces of the body have surfaces to accept a clamp for holding the insert within a pocket of a toolholder.
12. A toolholder for supporting a cutting insert having a core with four sides defining a quadrilateral shape and having diametrically opposing corners with a pair of cutting portions having cutting tips extending from two diametrically opposing corners, wherein the toolholder is comprised of:
  - 5 a) a body having a front end;
  - b) a pocket with a floor and walls positioned rearwardly from the front end of the body, wherein the pocket has a core region adapted to conform to and provide support to the insert core;
  - c) wherein two walls in the core region are adapted to conform to and  
10 provide support to two sides of the insert core;
  - d) wherein the floor in the core region is adapted to conform to and provide support to the insert core;

e) wherein the pocket further includes a recess extending rearwardly from the core region and of sufficient area to encompass one cutting tip of the insert when  
 15 the insert is mounted within the pocket;

f) wherein the core region of the pocket terminates at the front end of the body such that when the insert is positioned within the pocket, one cutting tip extends beyond the front end of the toolholder while the other cutting tip is encompassed by the pocket recess.

13. The toolholder according to claim 12, wherein the pocket further includes a threaded bore extending therein to accommodate a threaded bolt to secure the cutting insert within the pocket.

14. A toolholder assembly comprised of

I) a cutting insert with of an insert body having:

- a) a top surface and a bottom surface;
- b) sides between the top surface and the bottom surface, wherein  
 5 the sides are comprised of core sides and tip sides;
- c) top edges at the intersection of the top surface with the sides;
- d) bottom edges at the intersection of the bottom surface with the sides;
- e) a core defined by two pairs of core sides, wherein each pair has  
 10 a first core side and a second core side and wherein the top edge of each pair of core sides forms a core angle with one another;
  - 1) wherein, in a plan view, the top edge of the first core side of one pair is parallel to top edge of the first core side of the other pair;
  - 2) wherein, in a plan view, the top edge of the second core  
 15 side of one pair is parallel to top edge of the second core side of the other pair;
- f) a first cutting portion and a second cutting portion, each extending from the core, wherein each cutting portion is comprised of:
  - 1) a pair of tip sides having top edges converging at a tip angle to form a cutting tip; and  
 20 2) a bisector line bisecting the tip angle;

- g) wherein, in a plan view, the bisector lines of the first cutting portion is offset from and parallel to the bisector line of the second cutting portion, and
- h) wherein the tip angle is less than the core angle; and
- 25 II) a toolholder for supporting the cutting insert, wherein the toolholder is comprised of:
  - a) a body having a front end;
  - b) a pocket with a floor and walls extending rearwardly from the front end of the body, wherein the pocket has a core region that conforms to and
    - 30 provides support to the insert core;
    - c) wherein two walls in the core region conform to and provide support to two sides of the insert core;
    - d) wherein the floor in the core region is conform to and provide support to the insert core;
    - 35 e) wherein the pocket further includes a recess extending rearwardly from the core region and of sufficient area to encompass one cutting tip of the insert when the insert is mounted within the pocket;
    - f) wherein the core region of the pocket terminates at the front end of the body such that, with the insert positioned within the pocket, one cutting tip
      - 40 extends beyond the front end of the toolholder while the other cutting tip is encompassed by the pocket recess.

15. The toolholder assembly according to claim 15, wherein the pocket recess accommodates inserts ranging from an 85° diamond to a 35° diamond.

16. The toolholder assembly according to claim 14, wherein the pocket is sized to fully support the smallest insert that will fit within the pocket.

17. The toolholder assembly according to claim 16, further including a shim associated with each insert larger than the smallest insert that is mounted within the pocket of the toolholder.